

## 28V/2.5A Withstand Voltage Buck Li-Battery Switch Charger

PRELIMINARY DATASHEET

### Description

FH5304 is a 2.5A lithium-ion battery charger for 5.0V AC adapter. It is a synchronous buck converter with a fixed frequency of 550kHz. It has a charging efficiency of more than 90% and a very small calorific value.

FH5304 integrates 28.0V high-voltage devices, which can effectively prevent chip is damaged by surge voltage or incorrect connection of high-voltage adapter, and has high security. The FH5304 includes a complete charging termination circuit, automatic recharging and a 4.2V preset charging voltage with an accuracy of  $\pm 1\%$ . The FH5304 has many functions, such as anti back filling protection, output short circuit protection, chip and battery temperature protection.

FH5304 is packaged in a miniaturized DFN3x3-10L package, which requires only a small number of peripheral components and a very small area of PCB board. Therefore, FH5304 can be embedded in various handheld applications as an efficient charger for large capacity batteries.

#### Device Information (1)

PART NUMBER	PACKAGE	BODY SIZE (NOM)
FH5304	DFN (10L)	3.00mm × 3.00mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.

### Typical Application

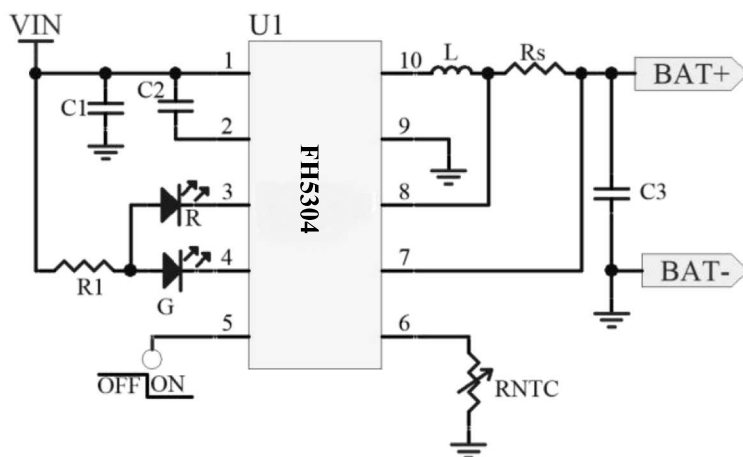


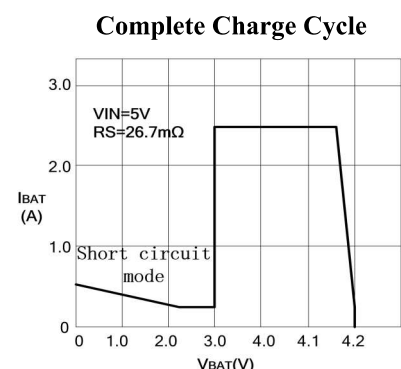
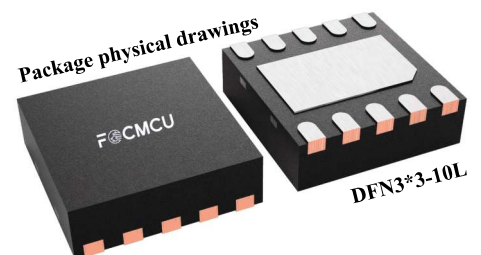
Figure1. FH5304 Typical Application Circuit

### Key Features

- The highest withstand voltage can reach 28.0V
- 6.3V input over voltage protection(OVP)
- Fixed switching frequency of 550kHz
- Output efficiency of more than 90%
- Maximum adjustable output current of 2.5A
- Automatic identification of input current and adaptive adapter
- There is no need to prevent reverse current diode
- No external power MOS transistor or freewheeling diode is required
- 4.2V charging voltage with accuracy of  $\pm 1\%$
- It can withstand 28.0V high voltage charging state dual indication output
- Shutdown current is only 20uA
- 2.9V trickle charging
- Soft-start limits surge current
- Battery temperature monitoring function(NTC)
- Output short circuit protection function(OCP)
- Package type: DFN3\*3-10L

### Applications

- Electronic cigarette
- Power tools
- Digital camera
- Portable equipment, various chargers
- MP3 and MP4 players
- Electronic dictionary



## Pin Description

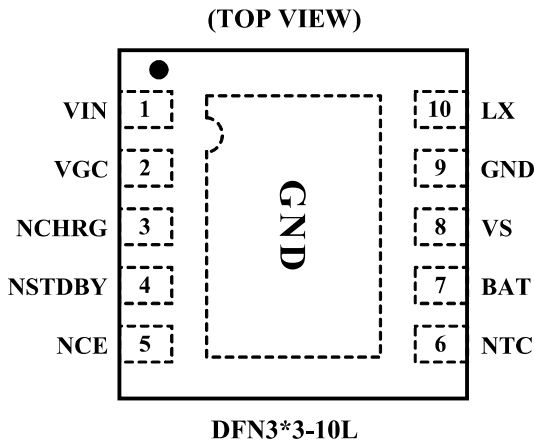


Figure 2. FH5304 pin package

PIN	Symbol	Function
1	VIN	Input power terminal
2	VGC	Internal drive clamp end
3	NCHRG	Battery charging indicating terminal
4	NSTDBY	Battery charging completion indicator
5	NCE	Enable control terminal
6	NTC	Battery temperature detection input
7	BAT	Battery voltage detection terminal
8	VS	Battery current detection terminal
9	GND	Land
10	LX	Switch end

## PIN Configuration

**VIN (PIN 1):** Input voltage terminal, the maximum withstand voltage of this terminal is 28V, and the charging working voltage is 4.2 ~ 6.0V.

**VGC (PIN 2):** Gate voltage clamp of internal driving tube, and a capacitance of 0.1uF is connected between this end and VIN.

**NCHRG (PIN 3):** State of charge indication terminal. When the charger charges the battery, the pin is pulled to the low level by the internal switch, indicating that the charging is in progress, otherwise the pin is in the high resistance state.

**NSTDBY (PIN 4):** Charging completion indication terminal. When the battery charging is completed, the pin is pulled to the low level by the internal switch, indicating that the charging is completed; otherwise, the pin is in the high resistance state.

**NCE (PIN 5):** Enable control terminal. The input low level will make the chip in the normal working state; the input high level will make the chip in the charging forbidden state. NCE pin can be driven by TTL level or CMOS level.

**NTC (PIN 6):** Battery temperature detection input. Connect the pin to the output terminal of the NTC sensor of the battery. If the voltage of NTC pin is less than 180mv or greater than 1.35v, it means that the battery temperature is too high or too low, and charging is suspended. If the NTC is suspended, the battery temperature detection function is cancelled and other charging functions are normal.

**BAT (PIN 7):** Battery voltage detection terminal. When the charging is stopped, the leakage current of bat pin is less than 3uA.

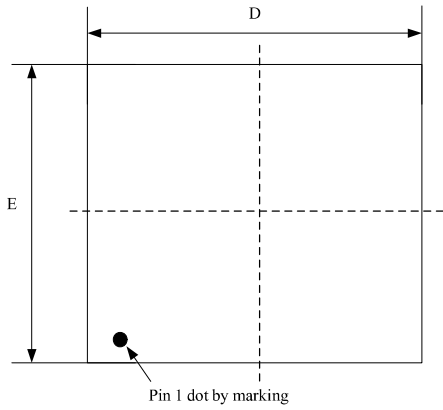
**VS (PIN 8):** Battery current detection terminal. A high-precision milliohm resistor  $R_S$  is connected between this terminal and bat, which is used to set the charging current during fast charging. The calculation formula is  $I_{BAT} = 0.0667 / R_S$  (A)

**GND (PIN 9):** Power ground. The GND terminal must be reliably connected with the heat sink at the bottom of the chip and the copper laying on the PCB board.

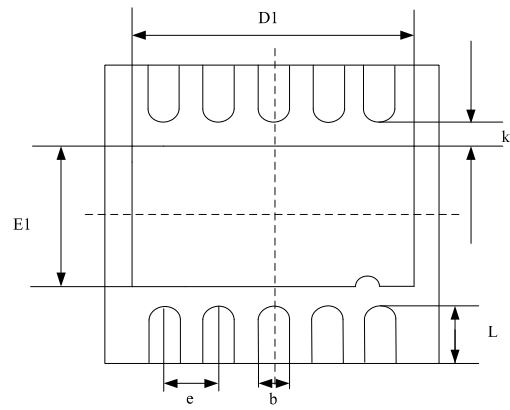
**LX (PIN 10):** Built in power MOSFET connection point. LX is the current output terminal of FH5304, which is connected with external inductance as the input of battery charging current.

## PACKAGE OUTLINE

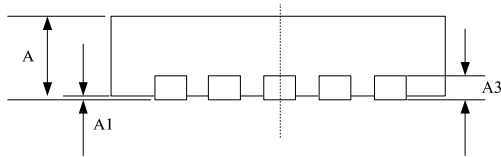
Type: DFN3x3-10L



TOP VIEW



BOTTOM VIEW



SIDE VIEW

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700/0.800	0.800/0.900	0.028/0.031	0.031/0.035
A1	0.000	0.050	0.000	0.002
A3	0.203REF		0.008REF	
D	2.924	3.076	0.115	0.121
E	2.924	3.076	0.115	0.121
D1	2.300	2.500	0.091	0.098
E1	1.600	1.800	0.063	0.071
k	0.200MIN		0.008MIN	
b	0.200	0.300	0.008	0.012
e	0.500TYP		0.020TYP	
L	0.324	0.476	0.013	0.019

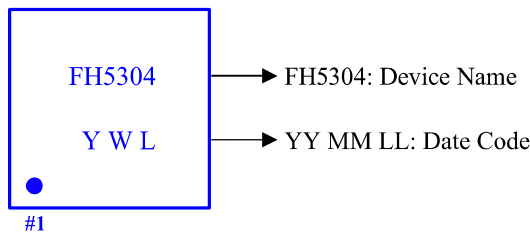
## ORDERING INFORMATION

Part Number	Input Voltage	Features	Operating Temperature	Package Type	Top Mark	SPQ
FH5304D10	~ 28.0V	<ul style="list-style-type: none"> <li>• Buck li-ion battery charger</li> <li>• Vflog: 4.2V(±1%)</li> <li>• Fixed switching frequency: 550kHz</li> <li>• Output current: 2.5A(adj.)</li> <li>• 2.9V trickle charging</li> </ul>	-40°C to +85°C	DFN3.0*3.0-10L	FH5304 <u>Y W L</u>	5000EA/Reel

**Note:**

- **FH5304** devices are Pb-free and RoHs compliant.
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- If you have any other custom purchase needs, please contact our sales department.
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**Device Name: DFN3\*3-10L**



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▲ Update by Apr.2021